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| 10/799,146 | 03/12/2004 | Yuxiang May Wang | APPM/008244/DSM/BCVD/JW | 7933 |

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| EXAMINER |
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HARRISON, MONICA D

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| ART UNIT | PAPER NUMBER |
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2893

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03/06/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|---------------------------------------|------------------------------------|--|
| Office Action Summary | Application No. 10/799,146 | Applicant(s) WANG ET AL. | |
| | Examiner Monica D. Harrison | Art Unit 2893 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11,20,27 and 37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11,20,27 and 37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/28/06; 12/12/08</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Applicant's petition for reinstating an appeal filed 4/3/08 has been entered as a request for consideration.
2. The application is reopened.

Response to Amendment

After further consideration, it is determined that the after final amendment, dated 11/1/06, should have been entered. Accordingly, applicant's after final (AF) amendment filed 11/1/06 has been entered. Claims 1-10, 12-19, 21-26 and 28-36 are cancelled. Claims 11, 20, 27 and 27 are still pending.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 11, 20, 27 and 37 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Regarding claims 11 and 27, applicant discloses patterning resist material on the anti-reflective coating. However, the resist layer had never been deposited to be patterned. It appears that a method step is missing.

4. Claims 20 and 37 are rejected as being dependent on an indefinite base claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11, 20, 27 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yeh (6,853,043 B2) in view of Callegari et al (6,395,650 B1).

5. Regarding claim 11, Yeh et al discloses a method for processing a substrate in a processing chamber, comprising: forming a dielectric material layer (Figure 3B, reference 42) on a surface of the substrate (Figure 3B, reference 40); depositing one or more amorphous carbon layers consisting essentially of hydrogen and carbon on the dielectric material layer (Figure 3B, reference 44) by a process comprising (column 5, lines 26-30): introducing a processing gas comprising one or more hydrocarbon compounds without containing silicon and an argon carrier gas (column 5, lines 30-39); generating a plasma of the processing gas by applying power from a dual- frequency RF source (column 5, lines 40-52); etching the one or more amorphous carbon layers to form a patterned amorphous carbon layer (Figure 3D, reference 44); etching feature definitions in the dielectric material layer corresponding to the patterned one or more amorphous carbon layers (Figure 3D, reference 50); depositing an anti-reflective coating on the one or more amorphous carbon layers (Figure 3D, reference 46); patterning resist material on the anti-reflective coating (Figure 3D, reference 48); and etching the anti-reflective coating prior to or concurrent with etching the one or more amorphous carbon layers (Figure 3D, references 44 and 46).

How ever, Yeh et al does not disclose an argon carrier gas.

Callegari et al discloses an argon carrier gas (column 3, lines 9-26).

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It is known in the art to use inert gasses with hydrocarbons in order to form amorphous layers.

It would have been obvious, at the time the invention was made, for one having ordinary skill in the art, to modify Yeh et al with the teachings of Callegari et al, for the purpose of forming amorphous layers by the use of argon gas with a hydrocarbon.

6. Regarding claim 20, Yeh et al in view of Callegari et al disclose removing the resist material prior to etching feature definitions in the dielectric layer (Figure 3C, reference 48).

7. Regarding claim 27, Yeh et al discloses a method for processing a substrate, comprising: depositing one or more dielectric layers (Figure 3B, reference 42) on a substrate surface (Figure 3B, reference 40), wherein the one or more dielectric layers comprise silicon, oxygen, and carbon and has a dielectric constant of about 3 or less (claim 10); forming one or more amorphous carbon layers consisting essentially of hydrogen and carbon on the one or more dielectric layers by a process comprising (Figure 3B, reference 44; column 5, lines 25-30): introducing a processing gas comprising one or more hydrocarbon compounds without containing silicon and an argon carrier gas (column 5, lines 30-39); generating a plasma of the processing gas by applying power from a dual- frequency RF source (column 5, lines 40-52); defining a pattern in at least one region of the one or more amorphous carbon layers (Figure 3D, reference 50); forming feature definitions in the one or more dielectric layers by the pattern formed in the at least one region of the one or more amorphous carbon layers (Figure 3D, reference 50); depositing one or more conductive materials in the feature definitions (column 6, lines 47-53); depositing an anti-reflective coating on the one or more amorphous carbon layers (Figure 3D, reference 46); and patterning resist material on the anti-reflective coating (Figure

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3D, reference 48); and etching the anti-reflective coating prior to or concurrent with etching the one or more amorphous carbon layers (Figure 3D).

How ever, Yeh et al does not disclose an argon carrier gas.

Callegari et al discloses an argon carrier gas (column 3, lines 9-26).

It is known in the art to use inert gasses with hydrocarbons in order to form amorphous layers.

It would have been obvious, at the time the invention was made, for one having ordinary skill in the art, to modify Yeh et al with the teachings of Callegari et al, for the purpose of forming amorphous layers by the use of argon gas with a hydrocarbon.

8. Regarding claim 37, Yeh et al in view of Callegari et al discloses wherein at least one of the one or more amorphous carbon layers comprise an anti-reflective coating (Figure 4, reference 46a).

Response to Arguments

9. Applicant's arguments with respect to claims 11, 20, 27 and 37 have been considered but are moot in view of the new ground(s) of rejection. Yeh et al (6,853,043 B2) discloses all of the above claimed subject matter.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica D. Harrison whose telephone number is (571)272-1959. The examiner can normally be reached on M-F 7:00am-3:30pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Davienne Monbleau can be reached on 571-272-1945. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Monica D. Harrison/
Examiner, Art Unit 2893

mdh
February 27, 2009

/Davienne Monbleau/
Supervisory Patent Examiner, Art Unit 2893